Neurolinguistic & psycholinguistic investigations on evidentiality in Turkish

Arslan, Seckin

CHAPTER 1

1. General introduction

In about a quarter of the world languages, choosing a verbal form to describe an event depends on the type of evidence available to the speaker (Aikhenvald, 2004). This is referred to as 'evidentiality', the linguistic expression of information sources the speaker has available for his statement (Aikhenvald, 2004; Chafe & Nichols, 1986; De Haan, 1999; Givón, 1982; Lazard, 2001; Mushin, 2000; Plungian, 2001, 2010; Willett, 1988). In recent years, there have been an increasing number of analyses describing different types of evidential systems in languages around the world; however, experimental studies on those systems are limited. The next four chapters cover the experimental investigations on evidentiality in Turkish.

1.1. Introduction

In Turkish, finite verbs are marked for direct (**-DI**) and indirect evidential (**-mIş**) forms, requiring the speaker to distinguish whether the event being described is known from direct or indirect sources. This dissertation aims to unveil the cognitive underpinnings of evidential morphology in Turkish with regard to its loss in aphasia and in bilingual heritage speakers. In particular, the following experimental aspects of evidentiality are investigated: (1) *Neurolinguistic aspects*, whether and how the evidential forms dissolve in speakers with aphasia, and (2) *Psycholinguistic aspects*, how evidential forms are processed in real-time by healthy monolingual and bilingual speakers of Turkish, with a focus on heritage speakers. In this section, the neurolinguistic and psycholinguistic lines of research will be briefly introduced, relevant features of the evidential forms in Turkish will be described, and issues addressed in this dissertation will be spelled out.

1.1.1. Neurolinguistic aspects: Studies on agrammatic aphasia

Aphasia is an acquired language disorder as a result of brain damage. There are several reasons that cause aphasic symptoms to surface. One of the most common causes is a stroke, which, in the case of aphasia, disrupts the blood supply to the language areas of the brain. However, aphasia can also be a consequence of traumatic brain injury, brain tumors, intracranial infection, or other forms of neurodegenerative diseases. Post-stoke aphasia is the most commonly observed clinical case in Turkey, where about 100,000 people suffer from stroke each year, and quite a high proportion of those patients acquire aphasia (Maviş, 2007). Types of aphasia are often classified on the basis of speech output: fluent and non-fluent (agrammatic). The current dissertation deals with the latter.

Most incidences of non-fluent aphasia demonstrate an agrammatic speech pattern, which is characterized by reduced grammatical complexity and correct sentences, short utterances, telegraphic speech pattern, and a sustained difficulty with verbs and verb morphology (Bastiaanse & Jonkers, 1998; Menn & Obler, 1990; Miceli, Silveri, Romani, & Caramazza, 1989; Saffran, Berndt, & Schwartz, 1989). Agrammatic speakers frequently omit and/or substitute inflectional morphology (Badecker & Caramazza, 1986). However, many studies have shown that not all areas of inflectional morphology are equally prone to agrammatic impairments: while agreement and/or mood morphology is relatively spared, tense morphology is affected (e.g., Burchert, Swoboda-Moll, & De Bleser, 2005; Clahsen & Ali, 2009; Stavrakaki & Kouvava, 2003; Wenzlaff & Clahsen, 2004, 2005).

Within Tense impairments in agrammatism, however, the degree and likelihood of a Tense form being impaired are related to the semantic category onto which they map. That is, verb forms that refer to the past are found to be more impaired in agrammatic speakers than verb forms that refer to present and future time frames (Abuom & Bastiaanse, 2013; Bastiaanse et al., 2011; Bos & Bastiaanse, 2014; Bos, Dragoy, Avrutin, Iskra, & Bastiaanse, 2014; Yarbay-Duman & Bastiaanse, 2009). Bastiaanse et al. (2011) hypothesize that past time-reference (be it through verbs or aspectual adverbs) is difficult for agrammatic speakers. This is based on Zagona's (2003) claim that past tense verbs require discourse linking[1] and Avrutin's (2000; 2006) results showing that discourse-linked elements are impaired in agrammatic aphasia. Bastiaanse coined this hypothesis the Past Discourse Linking Hypothesis (PADILIH; see Bastiaanse, 2013 for an overview).

[1] Zagona (2003) proposes that the use of a Tense form is licensed with regard to relations between event-time and speech-time as internal/external arguments. According to this hypothesis, past tense is a referential expression requiring an external argument (i.e., at the level of discourse) and event-time is disjointed from speech-time whereas in non-past tenses, event-time is within the maximal projection of the verb.

1.1.2. Psycholinguistic aspects: Studies on heritage bilingualism

A heritage language is defined as the 'family language' that is spoken by the households of an individual which is different than what the society speaks (Valdés, 2005). The term *heritage language* is also used in reference to 'immigrant', 'refugee' and 'indigenous' languages (Wiley, 1999). Within the European perspective, however, heritage languages are commonly referred to as 'minority languages' (De Bot & Gorter, 2005).

In this thesis, a rather narrow definition of a heritage-language speaker is adopted: an early bilingual speaker of a heritage (immigrant, minority, or family language)[2] and a dominant majority-language pair. Essentially, heritage speakers are asymmetrical bilinguals, as they acquire their family language in childhood, but in time, their second language becomes more dominant (see also Benmamoun, Montrul, & Polinsky, 2013). Heritage-language speakers, especially those who have acquired their languages in an immigrant setting, tend to diverge from monolingual speakers in several aspects of their first language. For instance, Doğruöz and Backus (2009) have shown that Turkish spoken in the Netherlands differs in many ways from Turkish spoken in Turkey.

Experimental investigations on heritage-language speakers are relatively new and expanding. Most of these studies have concentrated on heritage languages spoken in the U.S. (see studies on Spanish by Montrul, 2002, 2008, 2009; Silva-Corvalán, 1994, on Portuguese by Rinke & Flores, 2014; Rothman, 2007, on Russian by Polinsky, 2008, 2011; Sekerina & Sauermann, 2014, on Korean by Kim, Montrul, & Yoon, 2009, and on Arabic by Albirini & Benmamoun, 2012; Albirini, Benmamoun, & Chakrani, 2013; Albirini, Benmamoun, & Saadah, 2011). What these studies have shown is that heritage speakers perform worse on linguistic tasks in their first language as compared to monolingual speakers; and that

[2] Not to be confused with minority communities (e.g., religious and ethnic groups), here the term minority language is taken as a language that is used by a smaller number of speakers as compared to the speakers of a dominant majority language.

verbal morphology is particularly affected. That is, heritage speakers tend to be less sensitive to grammatical properties of their first language than monolingual speakers.

Roughly, there are two accounts that attempt to explain the nature of language loss shown in heritage speakers' performances in verbal morphology: *attrition* and *incomplete acquisition*. Attrition means that certain language structures erode after full acquisition of the first language (Cook, 2003; De Bot & Weltens, 1991; Gürel, 2004; Köpke, Schmid, Keijzer, & Dostert, 2007; Köpke & Schmid, 2004; Pavlenko, 2004; Seliger & Vago, 1991; Sorace & Serratrice, 2009; Yağmur, 1997). First language attrition has been associated with late bilingualism, yet there is evidence that heritage speakers may also be affected by attrition (Polinsky, 2011). Incomplete acquisition means that properties of the first language, especially the ones that do not occur in the second language, are prone to incomplete acquisition processes during childhood, and hence, are not properly acquired by heritage speakers, which leads to 'gaps' in their grammars (e.g., Albirini et al., 2013; Albirini et al., 2011; Montrul, 2002, 2008, 2009; Polinsky, 2006).

Not all areas of inflectional morphology are globally affected in heritage grammars. Most of the studies that demonstrated asymmetrical incomplete acquisition and attrition patterns in heritage speakers have argued in favor of the *interface vulnerability*. This is based on the Interface Hypothesis (Sorace, 2000; Sorace & Filiaci, 2006; Sorace & Serratrice, 2009). According to this point of view, integrating information from different linguistic levels into an interface (e.g., the syntax–pragmatics interface) is effortful for bilingual individuals. However, language structures requiring knowledge in a single linguistic domain (e.g., core syntax) are relatively spared in language attrition and incomplete acquisition.

1.2. Linguistic introduction

1.2.1. Evidentiality: A brief snapshot

Evidentiality expresses how a speaker obtains knowledge about an event, such as, but not limited to, eye-witnessing, hearing, reporting, and inferring (Aikhenvald, 2003, 2004; Aksu Koç, 2009; Boas, 1938; Jakobson, 1957; Mushin, 2000; Plungian, 2010; Willett, 1988). In most languages, evidentiality may be expressed by either lexical means or verb semantics. For instance, the speaker attests witnessed information in the following sentence: "I saw two boys walking home." However, referring to information sources constitutes an obligatory grammatical category in certain languages, as Boas (1938) and Jakobson (1957) pointed out. That is, by using these grammatical 'evidential' forms, the speaker is able to communicate from which sources he/she obtains knowledge about an event. However, not all 'evidential' languages have a universal way of marking evidentiality. The number of evidential terms in a language and their semantic complexity vary considerably across languages.

Table 1.1 presents an overview of Aikhenvald's (2004) classification of information sources marked by evidential forms. According to Aikhenvald's analysis, the following information sources surface as verbal forms: VISUAL, SENSORY (or non-visual), INFERENCE, ASSUMPTION, REPORTED, and QUOTATIVE. It is unknown whether a language with all these evidential forms exists. Occasionally, one or two of those semantic categories of information sources may be expressed within one evidential form. For instance, most Balkan languages morphologically mark indirect information that may cover inference and reported (and sometimes, assumed) information sources.

Table 1.1. *Types of evidential forms and their meanings based on Aikhenvald's (2004, pp. 63-64) classification*

Evidential form	*Meaning*
VISUAL	Witnessed (seen) information
NON-VISUAL	Non-witnessed information acquired by hearing, smelling, taste, or touch
INFERENCE	Non-witnessed information evidenced on the basis of physical clues or resultant states
ASSUMPTION	Information deduced on the basis of logical reasoning or general knowledge
REPORTED	Reported information from another speaker (i.e., hearsay)
QUOTATIVE	Reported information with a particular reference to its source

Turkish is a member of the *two-term* evidential languages, like several other Eurasian languages (including Armenian, Bulgarian, Georgian, Iranian). As the name suggests, two-term evidential languages typically have two verb forms designated to express information source, commonly referred to as *direct* and *indirect* evidentials (Friedman, 2003; Johanson & Utas, 2000; Slobin & Aksu, 1982, among others).[3]

In larger paradigms, there may be three to five evidential forms available. Consider Cuzco Quechua, a Quechuan language mostly spoken in Peru, where information source distinctions are expressed through three verb forms: direct (**-mi**), inference or conjectural (**-ch´a**), and reportative (**-si**) evidential enclitics (Faller, 2002). See also Floyd (1999); Muysken (1995), and Weber (1986) for other Quechuan languages/dialects. In contrast to the Turkish indirect evidential, Quechua has grammatical ways to dissociate inferred information from reported information. There are

[3] Friedman (1986) refers to the direct-indirect opposition as *definite* and *indefinite* past tenses. This is possibly based on the typological tradition that evidentiality in most Balkan languages is assumed to have been derived from past tenses and/or perfect aspect markers historically; see also Friedman (1978, 2004).

some other languages, where direct information is divided into visual and non-visual (sensory) evidence marked by separate verb forms. Consider Tucano, a language spoken in the Amazon in Brazil, where there are four evidentials allowing the speaker to express visual (**-ámi**), non-visual (**-ásĩ**), inferred (**-ápĩ**), and reported (**-ápi**) information (Aikhenvald, 2004, p. 52).

To summarize, evidentials are expressed through inflectional morphology referring to types of information sources in a number of languages. Availability, distribution, and semantic complexity of different evidential terms vary typologically. Turkish belongs to a two-term evidential system, whereby types of direct and indirect evidence of the speaker for his proposition are grammaticalized. Below, relevant properties of evidentiality in Turkish are described in detail.

1.2.2. Evidentiality in Turkish

Describing events in the past for a Turkish speaker comes with two 'flavors': Either the direct or the indirect evidential form is chosen for situations known through direct or indirect information sources, respectively. These evidential forms are inflectional morphemes designated for finite verbs and non-verbal predicates. The morpheme –DI is used when one aims to communicate that what is being said is based on direct information: the speaker is the firsthand source. The morpheme –mIş is chosen when the speaker is not the firsthand source and the information asserted is known indirectly by report of another speaker or by inference; see Aksu-Koç and Slobin (1986); Erguvanlı-Taylan (1997); Sezer (2001); Slobin and Aksu (1982). Hence, if someone wants to communicate the meaning of the sentence "Kemal arrived" in Turkish, there are two options: with a direct evidential or with an indirect one, as illustrated in (1a)-(1b).

(1) a. Kemal gel**di** [Slobin and Aksu (1982, p. 187)]
Kemal come DIRECT EVID 3SG
"Kemal arrived" (witnessed information)

b. Kemal gel**miş**
Kemal come INDIRECT EVID 3SG
"Kemal arrived" (inferred or reported information)

The default reading of the evidential forms, when appended to simple, finite verbs, indicates that the event being described happened in the past, unless supported by non-past temporal adverbs. Hence, the use of a direct evidential, as in (1a), is typically licensed by the speaker's direct experience regarding a past event, and the use of an indirect evidential, as in (1b), is linked to a form of indirect evidence about a past event. See also section 1.2.5 for time reference in Turkish evidentials.

1.2.3. The direct evidential

The direct evidential, marked by the morpheme –DI as well as the predicate-final particle IDI, denotes that asserted information is based on the speaker's firsthand access to its source, which can be the speaker's eye-witnessing, participation, or direct perception.[4] Lewis (1967) defines -DI as the "past events known to the speaker" and Underhill (1976) referred to this verb form as the "definite witnessed past." Aksu-Koç (1988, 2000); Aksu-Koç and Slobin (1986); Slobin and Aksu (1982) argued that the morpheme

[4] Notice that the direct evidential form may also be used for non-witnessed but well-assimilated historical events. In (i) below, a historical event is described, which the speaker cannot have witnessed, yet a direct evidential is used. Well-known historical events are assumed to be witnessed by the society, thus, the use of direct evidential is reasonable in such contexts, see also Plungian (2010).

(i) Kemal Paşa Selanik'te doğdu. [Johanson (2006, p. 85)]
Kemal Paşa Thessaloniki LOC bore DIRECT EVID.3SG
"Kemal Paşa was born in Thessaloniki"

marks the "past of the direct experience." On the basis of these accounts, in this dissertation, we argue that the morpheme –DI marks the 'direct evidential' whose use is appropriate in contexts that relate to the speaker's direct experience[5] see (2a)-(2c) for examples.

(2) a. Adam sütü içti
Man milk ACC drink DIRECT EVID.3SG
"The man drank the milk" (visual firsthand evidence: the speaker witnessed the event)

b. Adam bizimle top oynadı
Man us INSTRUMENTAL ball play DIRECT EVID.3SG
"The man played football with us" (participatory firsthand evidence: the speaker participated in the event)

c. Güller çok güzel koktu
Roses very beautiful smell DIRECT EVID.3SG
"The roses smelt so nice" (sensory firsthand evidence: the speaker smelled the roses)

As argued above, the uses of the direct evidential is associated with a form of direct evidence. In (2a), for instance, it is conceivable that the speaker saw that the man was drinking milk. The use of a direct evidential form may also be licensed by the speaker's participation in the event, as illustrated in (2b). A third possible context where the use of a direct

[5] Notice that the precise evidential status of the direct evidential is subject to debate among Turkish linguists. According to Johanson (2003), the morpheme –DI, which we introduced as the direct evidential form here, does not consistently make reference to direct experience or visual evidence. This is based on an assumption that the direct evidential is taken to be an unmarked neutral opposition of the indirect evidential form. Many other descriptive analyses, however, suggest the contrary; see for instance, Aksu-Koç (2000); Kornfilt (1997b); Lewis (1967).

evidential would be appropriate is the speaker's direct non-visual experience based on a piece of sensory evidence, as shown in (2c).[6]

1.2.4. The indirect evidential

The indirect evidential, marked with the morpheme –(I)mIş[7] as well as the predicate-final particle ImIş, conveys that the description of an event is based on a type of non-firsthand or indirect information. Turkish linguists treat the morpheme –(I)mIş as the past of indirect experience (Banguoğlu, 1974; Johanson, 1971) or as a marker of inferred past (Cinque, 2001; Lewis, 1967). Underhill (1976) states that –(I)mIş codifies that a piece of information is not a part of the speaker's previous knowledge.

The indirect evidential form marks three differential contexts: inference, report (hearsay), and surprise (Slobin & Aksu, 1982).[8] Inferential readings associated with the indirect evidential are linked to a type of non-witnessed evidence on the basis of which the speaker conjectures that an event happened without previous knowledge about that event. Kinds of

[6] Non-visual sensed events may also be described using the indirect evidential form, see Johanson (2000). For instance, one can utter *Çorba çok tuzlu ol**muş*** INDIRECT EVID "The soup happens to be very salty" after taking a sip from the soup.

[7] According to some studies, there are two distinct morphological forms to mark indirect evidence. Namely –mIş and –(I)mIş; see for instance, Csató (2000). According to these analyses, the morpheme –mIş is used on the bare verb stem, marking both past time-reference and inferential contexts, while the morpheme –(I)mIş is used on complex verbs (i.e., after aspectual or mood suffixes) and nominal predicates to mark indirect information, especially in reportative contexts (e.g., Aksu-Koç, 2000); but see also Gül (2009).

[8] Marking of surprise is referred to as *mirativity*. In Turkish, mirative readings of the indirect evidential may indicate that the event indirectly experienced by the speaker is unexpected and surprising (Aksu-Koç & Slobin, 1986; DeLancey, 2001). Since the current thesis concentrates on information source specifications of the evidential forms, their mirative connotations will not be further discussed.

evidence that lead to inference may be physical or sensory clues that are either results of the event or the speaker's deferred realization of an existing state. The reportative readings of the indirect evidential encode that the speaker knows an event through 'hearsay' or utterances of another speaker. See (3) for an example.

(3) Adam sütü içmiş
Man milk ACC drink DIRECT EVID
"The man drank the milk" (non-witnessed, indirect information)
a. *Inference*: the speaker saw an empty glass of milk, which possibly the man had drunk
b. *Report*: the speaker has been told about this event

The use of an indirect evidential in (3) gives rise to two possible scenarios with regard to the information source of the event being referred to. One possible scenario is that the event is known to the speaker through an inferential process, as provided in (3a). Here in this specific example, the speaker may see an empty glass and that the man seems pleased, leading the speaker to infer that man had drunk the milk. Another possible scenario for the use of the indirect evidential, as described in (3b), is that the event has been reported to the speaker.

The use of indirect evidential is compatible with contexts where the speaker's information on an existing state is delayed (i.e., deferred realization), although the actual event may have been in progress within the immediate environment as the speaker. Consider (4).

(4) Bu ağaç ne çabuk büyümüş
This tree what quick grow INDIRECT EVID 1.SG
"How quickly this tree has grown"

The use of the indirect evidential in (4) is triggered by the speaker's deferred realization of the event. Such uses of the indirect evidential are

consistent with verbs expressing slow gradual progress, which is often not immediately possible to witness (i.e., one needs to wait day-and-night to actually attest how quickly a tree grows).

Deciding which evidential form to choose in describing an action is determined by whether the information has been accessed by the speaker himself or by someone else. Hence, the marking of an evidential context and that of person is correlated. Arguably, indirect evidentials may be preferably used with non-first-person rather than first-person (Curnow, 2002). Aikhenvald (2004) argues that it works against intuition when one talks about his own information while using an indirect evidential form, as the use of a direct evidential is linked to a type of witnessed evidence. In Turkish, this mismatch between the first-person context and indirect evidential is largely reasonable. Aksu-Koç (2000); Aksu-Koç and Slobin (1986) state that the indirect evidential form may convey a "lack of conscious involvement" of the speaker; as shown by examples (5a)-(5b).

(5) a. Elimi kesmişim
Hand 1SG POSS ACC cut INDIRECT EVID 1SG
"I have cut my hand*"* (speaker lacks control over an unintentional action); (Aksu-Koç & Slobin, 1986, p. 160).

b. ? Kitap okumuşum
Book read INDIRECT EVID 1ST SG
"I have read a book" (speaker lacks control over an intentional action?)

In (5a), an indirect evidential is used in the first-person context. However, this is a reasonable reading since the verb "cut" here conveys an unintentional action (i.e., it is a non-volition verb). The action was carried out without the speaker's intention, and the speaker notices the action at a later time. In (5b), the speaker claims that he has read a book without consciously participating in it. Thus, the use of an indirect evidential in (5b) is unreasonable or counter-intuitive, at least in standard Turkish.

A final note on the indirect evidential: this evidential form has been traditionally analyzed as an epistemic modal marker (Aksu-Koç, 2000; Aksu-Koç & Slobin, 1986) relating the attitude of the speaker towards the truth of his proposition.[9] However, Johanson (2000, p. 81) disagrees with this and states that "the markers [i.e. the indirect evidential forms] are certainly epistemic in the sense that they concern the dimension of experience, but their task is not to express the speaker's attitude to the truth of the propositional content." Integrating these two points of view, it is assumed here that epistemic implications are marked by the indirect evidential to an extent. This is based on the idea that expressing information evidenced indirectly hinders the reliability of its source. However, as we will argue in this dissertation, epistemic modality is not the primary function of the evidential forms.[10]

1.2.5. Time reference and Turkish evidentials

Information source and time reference interact in contexts where Turkish evidentials are marked. As mentioned above, when applied to simple verbs, evidentials refer to past events. This is a possible reason why traditional Turkish grammars treat the evidential forms as past tenses (e.g., Banguoğlu, 1974; Underhill, 1976). This viewpoint seems to be legitimate to a degree,

[9] Whether evidentiality is a part of a modal system or has its own category is a much-debated controversy in the literature. Some treat evidentiality as a part of epistemic modality that deals with "degree of commitment of the speaker to the truth of his proposition" (Chafe & Nichols, 1986; Givón, 1982; Palmer, 1986; Willett, 1988). However, evidentials are assumed to constitute their own grammatical category independent of mood by recent studies (Aikhenvald, 2003, 2004; Cornillie, 2009; De Haan, 1999, 2005; Joseph, 2003; Plungian, 2001); but see Boye (2010) for arguments.

[10] In the current dissertation, information source specificitions of the evidential forms are addressed in their narrow semantics. Hence, extended semantics of the epistemic connotations will not be further discussed at this stage; however, interested readers can see Aksu-Koç (2014); Erguvanlı-Taylan (2014); Palmer (1986).

at least for the direct evidential, which is assumed to mark past events consistently.[11] However, when interactions between time reference and information source are considered, the picture becomes too complex to simply assume that both direct and indirect evidentials are past tenses only. Moreover, the aspectual nature of the evidential forms has been addressed in several studies, establishing that both the direct and indirect evidentials mark perfect aspect, which conveys completeness of the event being referred to (e.g., Erguvanlı-Taylan, 1997; Johanson, 1971, 2003; Kornfilt, 1997b; Taylan, 1984). Hence, the so-far conducted analyses on the temporal characteristics of the evidential forms are inconclusive when explaining the interactions between information source and time reference. Therefore, if it is assumed that both of the evidential forms are past tense and perfect aspect, the choice of one evidential over the other must be determined by their temporal or aspectual values. However, Yavas (1980) argues that when used on complex verbs or nominal predicates, the indirect evidential is not a tense/aspect marker but an evidential marker only.[12]

It is assumed here that evidentials have their own temporal characteristics, distinct from that of tense. This is based on Aikhenvald (2004, p. 99) who

[11] Also see Sezer (2001) who shows that the direct evidential, or the "definite past" as he calls it, marks present time-reference with verbs that indicate psychological or physical states, as shown in (ii).

(ii) şimdi çok üzüldüm (Sezer, 2001, p. 10)
now very sadden DIRECT EVID.1SG
"I am very saddened now"

[12] Consistent with this idea, the indirect evidential may be used after a tense/aspect marker, indicating that a non-past event is known through indirect information. In such contexts, the indirect evidential waives its past time reference value, as given in (iii).

(iii) Ali akşam çaya gelecekmiş
Ali night tea$_{ACC}$ come FUTURE.INDIRECT EVID. 1SG
"Ali will come for tea tonight, as I was told"

argues that "time reference of an evidential does not have to coincide with that of the event." Applying this analysis to Turkish, it reveals that the assumed 'indirect past' may indeed shift to present readings. Sezer (2001) shows that the uses of indirect evidential are consistent with past, present, and future temporal adverbs. This is an unexpected condition for a past tense or (present) perfect aspect morpheme. In a similar vein, Enç (2004) shows that the indirect evidential form may be ambiguous between past and non-past readings. In this thesis, we combine the idea that evidentials have their own temporal characteristics with the observations of Sezer (2001) and Enç (2004). In this respect, the reference point that best suits the Turkish evidentials is the time when the speaker receives the information about an event (i.e., evaluation time), rather than the actual event time. This issue is discussed in detail in Chapter 2.

1.2.6. Turkish evidentials in interrogative clauses

So far, the use of evidential forms in declarative clauses has been discussed, however, several studies have shown that evidentials in interrogative clauses have different meanings than those in declarative clauses (Aikhenvald, 2004; Faller, 2002; San Roque, Floyd, & Norcliffe, in press). Aikhenvald (2004) suggests that evidentials in interrogative clauses may convey information sources available to the questioner or to the addressee. Not much has been written about the uses of Turkish evidential forms in interrogative clauses.

In (6a)-(6b) and (7a)-(7b), question and answer pairs are given to illustrate direct and indirect evidentials in *wh*-questions, respectively. [13]

(6) a. Hangi adam elmayı ye**di**?
Which man apple ACC eat DIRECT EVID.3SG
"Which man ate the apple?" (The speaker assumes that the addressee has direct evidence)

[13] For the purposes of the current thesis, only *wh*-questions are addressed. However, interaction between the evidential terms and interrogativity is drastically large.

b. Bu adam yedi
This man eat DIRECT EVID.3SG
"This man ate (the apple)" (The addressee has direct evidence or witnessed the apple being eaten)

(7) a. Hangi adam elmayı ye**miş**?
Which man apple ACC eat DIRECT EVID.3SG
"Which man ate the apple?" (The speaker assumes the that addressee has no direct evidence)

b. Bu adam yemiş
This man eat DIRECT EVID.3SG
"This man ate (the apple)" (The addressee has no direct evidence)

The choice of a direct evidential form, as in (6a), signals that the information source is available to the addressee. The questioner presumes that the addressee witnessed the person eating the apple, hence, a direct evidential is selected. However, in (7a), the questioner surmises that the addressee has indirect information (e.g., inference or report); thus, an indirect evidential is preferred. In Chapter 5, this issue will be further discussed.

1.2.7. Evidentials and their narrative functions

The evidential forms are often used as narrative conventions, based on how the story being narrated is known to the speaker. In Turkish, the indirect evidential form is utilized as a narrative marker in relating events in conventional stories such as fairy tales etc. (Aksu-Koç, 1988; Johanson, 1971). The direct evidential is the appropriate form for narrating events that are relevant to the personal experience of the speaker.

1.3. Issues addressed within this dissertation

As discussed above, evidentiality is expressed through verb inflections in Turkish. Previous studies on aphasia and heritage bilingualism have shown that verb morphology is affected in these populations. In this thesis, the nature and extent of the language loss in evidential morphology is investigated from both pathological and non-pathological perspectives. The outcomes of these two lines of research are informative to the linguistic theories on evidentiality.

1.3.1. Neurolinguistic aspects of evidentiality

It has been shown that individuals with aphasia have problems with discourse-linked language structures (Avrutin, 2000; 2006). Bastiaanse et al. (2011) argue that reference to the past through grammatical morphology is impaired in agrammatic speakers for this reason: past time reference requires discourse linking. Past Discourse Linking Hypothesis (PADILIH) captures this by predicting that past time-reference involves access to information outside the sentence whereas non-past time reference does not since speech time and event time coincide. The PADILIH has received support from studies on several languages: Chinese, English, Turkish (Bastiaanse et al., 2011), Dutch (Bos & Bastiaanse, 2014), Russian (Bos, Dragoy, Avrutin, Iskra, & Bastiaanse, 2014; Dragoy & Bastiaanse, 2013), Spanish and Catalan (Martínez-Ferreiro & Bastiaanse, 2013; Rofes, Bastiaanse, & Martínez-Ferreiro, 2014), and Swahili and English (Abuom & Bastiaanse, 2013), to cite a few. In all of these languages, there is a selective impairment in referring to the past.

However, Turkish differs from these languages as it expresses evidentiality as a grammatical category, forcing the speaker to make a choice between the two verb forms that refer to the past. To find out how evidentials are affected in agrammatic aphasia, two studies have been carried out investigating *neurolinguistic aspects of evidentiality*. In

particular, two main research questions have been addressed by these studies:

1) Are Turkish agrammatic speakers able to produce the evidential verb forms that are linked to the respective information sources; are they able to identify the information source perspectives that the evidential verbs map onto?
2) Are the uses of the evidential verb forms affected compared to other verb forms in Turkish agrammatic speakers' narrative speech production?

These issues are addressed in Chapters 2 and 3.

1.3.2. Psycholinguistic aspects of evidentiality

As mentioned above, one of the aims of this dissertation is to understand how evidential verb forms are affected in bilingualism, especially in heritage speakers, whose first language (Turkish in this case) is a minority language. Previous studies on heritage speakers of Spanish (Montrul, 2002, 2008, 2009), Russian (Polinsky, 2006, 2008), and Arabic (Albirini et al., 2013; Albirini et al., 2011) among others have shown that verb inflections are particularly affected in this group as compared to monolingual speakers. Turkish typologically differs from these heritage languages with regard to the grammatical expression of evidential distinctions. The nature of evidentiality processing in heritage bilingualism has not been experimentally studied before.

In order to explore how the evidential forms are prone to attrition and/or incomplete acquisition in heritage speakers, two studies have been performed focusing on the *psycholinguistic aspects of evidentiality*. The following two research questions have been addressed in these studies:

3) To what extent is Turkish heritage speakers' processing of the evidential verb forms affected by incomplete acquisition or

attrition? Do the heritage speakers retain a monolingual-like sensitivity to sentential contexts where evidential forms are violated?

4) How do Turkish heritage speakers, as compared to late bilinguals and monolinguals, interact with forms of visual evidence presented in a virtual visual-world setting while listening to sentences with evidential forms, consistent with the given visual stimuli?

1.4. Outline of this dissertation

The following four chapters in this dissertation address the above-mentioned research questions. The next two chapters aim to contribute to our understanding of the *Neurolinguistic aspects of evidentiality*:

Chapter 2 aims at investigating production of evidential morphology and identification of the information sources that the evidential forms refer to in Turkish agrammatic aphasia. This is made possible by using two tasks: a sentence-production task where evidential verb forms were to be produced, and a source-identification task where the participants were asked to recollect information sources that map onto the evidential forms. According to theories of 'tense impairment', agrammatic speakers have more problems with tense forms over mood or agreement morphology (i.e., Friedmann & Grodzinsky, 1997; Wenzlaff & Clahsen, 2004, 2005). According to PADILIH, however, verb forms that refer to the past pose difficulties for agrammatic speakers (Bastiaanse et al., 2011). However, the validity of these hypotheses can best be tested through studying languages with rich inflectional paradigms. As introduced above, Turkish evidential morphemes may mark past time-reference and epistemically modal distinctions, besides their functions of marking information sources. Evidential morphemes have not been studied before in individuals with agrammatic aphasia. Results from this study provide us with insights into the underlying nature of the deficits in Turkish agrammatic aphasia.

In Chapter 3, we addressed the issue of verb production in Turkish agrammatic aphasia from a broader perspective by using a narrative speech-production experiment. The studies in which experimental tasks were administered to the agrammatic speakers showed that the direct evidential form is impaired as compared to present and future tense forms (see e.g., Bastiaanse et al., 2011; Yarbay-Duman and Bastiaanse, 2009) and to the indirect evidential forms (Arslan et al., 2014). However, it is not known whether the evidential forms are impaired as compared to inflectional morphemes other than tense and evidentiality. Furthermore, experimental tasks have technical limitations: it is fairly impossible to assess several inflectional morphemes in separate experimental conditions, and the agrammatic speakers tend to have low attention span, and thus, long experiments are not ideal. Therefore, as reported in Chapter 3, a narrative-speech study was administered to the agrammatic speakers of Turkish. This allows us to analyze several inflectional forms in the language.

The following two chapters seek to extend our knowledge about the *Psycholinguistic aspects of evidentiality*:

Chapter 4 aims to show how adult Turkish heritage speakers living in the Netherlands process evidentiality and time-reference morphology in Turkish as compared to a control group of Turkish monolingual speakers. Studies by Montrul and her colleagues, as introduced above, besides the others, have shown that inflectional morphology in heritage grammars is particularly vulnerable. Moreover, heritage speakers' problems are not similar in all inflectional forms. An account was put forth to explain the incomplete acquisition patterns in the heritage speakers. The interface vulnerability suggests that language structures requiring information integration at the interface of two linguistic levels (e.g., when syntax needs to be linked to pragmatics) are more effortful for heritage speakers to acquire than the structures that require knowledge of a single linguistic level. If this is true, Turkish heritage speakers are expected to have problems with evidential forms during their processing. This was exactly what we aimed to address in Chapter 4.

Chapter 5 focuses on moment-by-moment processing of evidentiality in heritage speakers of Turkish living in Germany as compared

to late bilingual speakers of Turkish and German (i.e., late arrivals) and Turkish monolinguals. Previous research on evidential forms in Turkish heritage speakers involved narrative speech-production tasks (e.g., Aarssen, 2001; Arslan & Bastiaanse, 2014b) and response-time tasks (see Chapter 4). Therefore, the moment-by-moment processing of evidential forms has been left unexplored. To investigate this, an eye-movement monitoring experiment was administered, as reported in Chapter 5. The findings have clear implications about whether the language loss in heritage bilinguals' processing of evidentiality is due to attrition or to incomplete acquisition. Furthermore, a discussion of the findings is provided, which includes, but is not limited to, the question of whether interface vulnerability or other linguistic factors can explain the attrition pattern in evidentiality.

Chapter 6 includes a general discussion of the results from the experimental studies reported in this dissertation. With this dissertation, an effort has been made to understand the cognitive underpinnings of evidentiality in Turkish with regard to its deterioration in individuals with aphasia and in speakers of Turkish as a heritage language. Aphasia and heritage bilingualism are completely different areas of language loss. However, the outcomes from the studies presented in the remainder of this dissertation indicate that the evidentials share similar 'fates' when it comes to their impairments in aphasia and the way they attrite in heritage speakers and late bilinguals.

Neurolinguistic aspects of evidentiality: *studies on agrammatic aphasia*